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«MIST: Aerospace - 2020: Advanced Technologies in Aerospace, Mechanical and Automation Engineering»

«Improvement Of The Method For Restoring The Bearing Supports Of Steel Crankshaft»

Authors

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Problem statement

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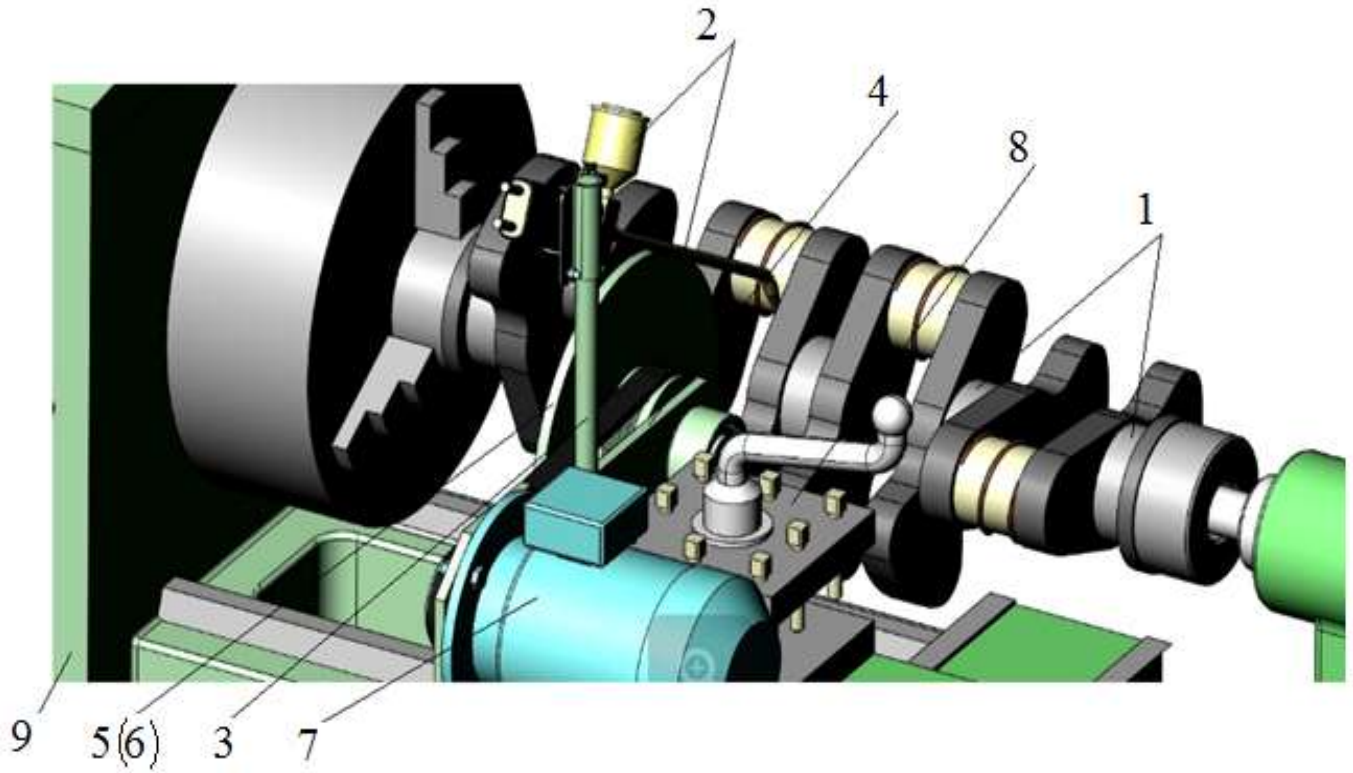
- to review the typical types of wear and existing technologies for the restoration of the bearing supports of steel crankshafts;
- to offer an improved (innovative) technology (method) of recovery;
- to conduct experimental research.

Solution methods

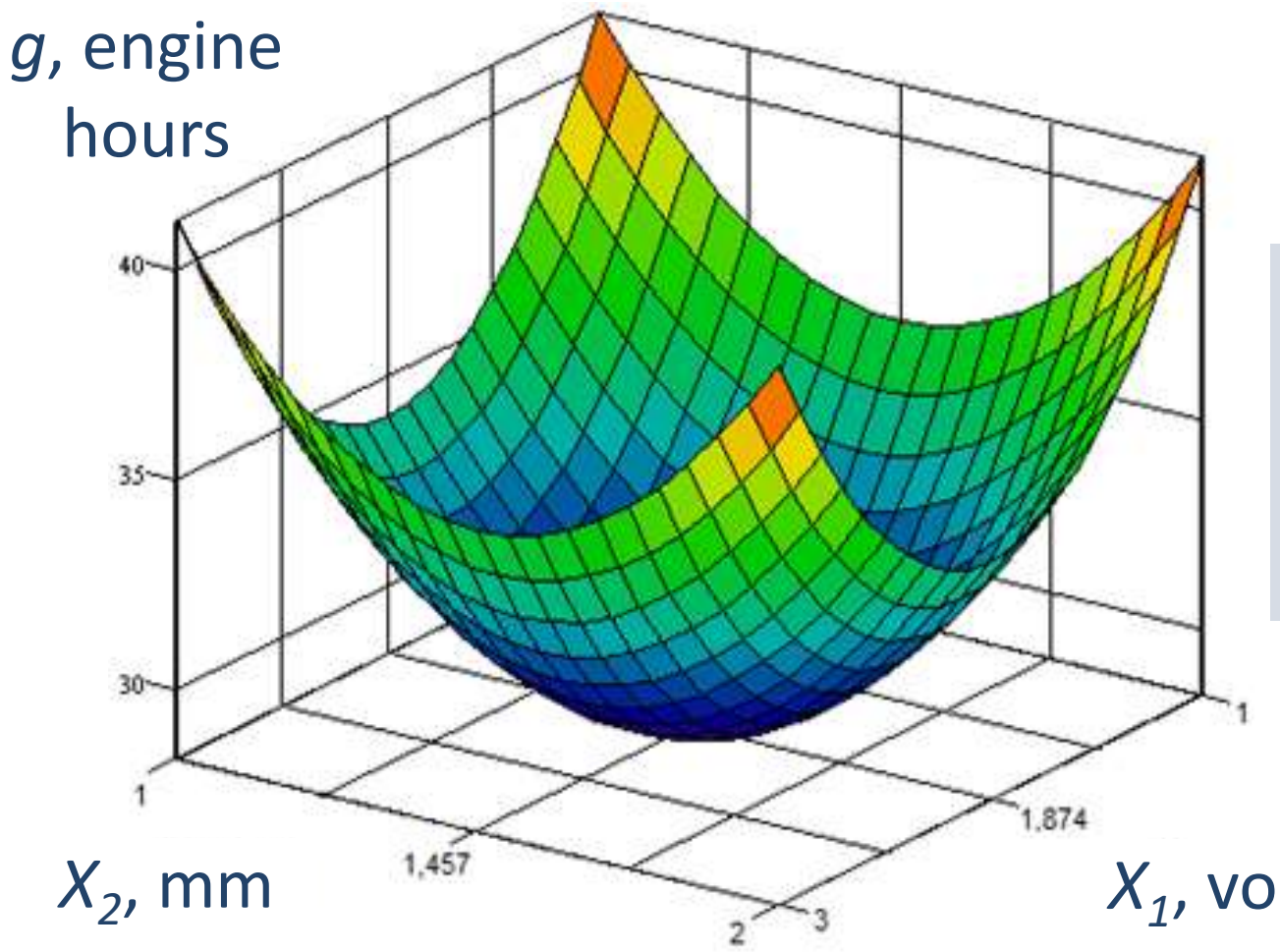
- The novelty of the method for restoring the journals of steel crankshafts is that due to the compaction, the surface layer of the metal is hardened, which leads to the appearance of residual stresses in the surface layer of the metal.

Solution methods



Crankshaft journal rebuilding tool: 1 – main bearing supports (journals); 2 – gas-flame burner; 3 – holder; 4 – base; 5 – disc made of hard alloy material, 6 – disc made of copper-containing alloy; 7 – electric motor; 8 – tool holder; 9 – screw-cutting lathe

Solution methods



Response surface of the dependence of the running time on the number of wire turns (N_i) and the width of the square wire (s_i)

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Conclusions

Results, implementation

- On the basis of a brief analysis of existing methods of repairing crankshafts, new engineering solutions have been developed for restoring its worn out steel journals.
- In practice, the proposed engineering solutions will provide an increase as technical as economic indicators, namely: an increase in the quality of the coating made by the gas-flame method of coating, and thanks to the coil of copper wire, the service life of the crankshaft will increase and the cost of repaired crankshafts will decrease in comparison with new ones.

Conclusions

Results, implementation

- As a result of the tests, a second-order regression equation was obtained, which takes into account factors such as the number of wire turns and the width of a square wire that affect the reduction of the engine running-in time.
- As a result of the implementation of the two-factor experiment according to the Vk plan, the optimal parameters were determined, provided that the least time spent on running the engine was ensured. According to the obtained regression equation, the shortest running-in time is 28.38 engine hours with the number of wire turns equal to 1.874 vol. and the optimal width of a square wire is 1.457 mm.

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